

CLAIMS

1 1. A method for dynamically patching code, comprising the steps of:
2 intercepting program instructions;
3 determining if a program instruction requires unavailable hardware
4 functionality; and
5 dynamically replacing the program instruction with a replacement instruction
6 that does not require unavailable hardware functionality if it is determined that the
7 program instruction requires unavailable hardware functionality.

1 2. The method of claim 1, wherein the step of dynamically replacing the
2 program instruction comprises fetching a replacement instruction and storing it in a
3 code cache.

1 3. The method of claim 2, wherein the step of dynamically replacing the
2 program instruction further comprises executing the replacement instruction in lieu of
3 the program instruction each time a function associated with the program instruction
4 is required.

1 4. The method of claim 3, wherein the replacement instruction comprises
2 part of a patch that is made available via an application programming interface.

1 5. The method of claim 1, further comprising the step of, prior to
2 determining if a program instruction requires unavailable hardware functionality,
3 determining if the program instruction has been cached.

1 6. The method of claim 5, further comprising the step of executing the
2 cached instruction in lieu of the program instruction if an associated instruction has
3 been cached.

1 7. The method of claim 1, further comprising the step of, prior to
2 intercepting program instructions, gaining control over execution of program
3 instructions by injecting a dynamic execution layer interface into the program.

1 8. The method of claim 1, further comprising the step of dynamically
2 receiving information about unavailable hardware functionality and replacement
3 instructions that are configured to replace original program instructions that require
4 the unavailable hardware functionality.

1 9. A system for dynamically patching code, comprising:
2 means for gaining control over execution of a program;
3 means for intercepting program instructions;
4 means for determining if a program instruction requires unavailable hardware
5 functionality; and
6 means for dynamically replacing the program instruction with a replacement
7 instruction that does not require unavailable hardware functionality if it is determined
8 that the program instruction requires unavailable hardware functionality.

1 10. The system of claim 9, wherein the means for dynamically replacing
2 the program instruction comprise means for fetching a replacement instruction and
3 storing it in a code cache.

1 11. The system of claim 9, further comprising means for determining if a
2 program instruction has been cached.

1 12. The system of claim 9, further comprising means for dynamically
2 receiving information about unavailable hardware functionality and replacement
3 instructions that are configured to replace original program instructions that require
4 the unavailable hardware functionality.

1 13. A dynamic patching program stored on a computer-readable medium,
2 comprising:

3 logic configured to gain control over execution of a program;

4 logic configured to intercept program instructions;

5 logic configured to determine if a program instruction requires unavailable
6 hardware functionality; and

7 logic configured to dynamically replace the program instruction with a
8 replacement instruction that does not require unavailable hardware functionality if it
9 is determined that the program instruction requires unavailable hardware
10 functionality.

1 14. The system of claim 13, wherein the logic configured to dynamically
2 replace the program instruction comprises logic configured to fetch a replacement
3 instruction and store it in a code cache.

1 15. The system of claim 13, further comprising logic configured to
2 determine if a program instruction has been cached.

1 16. The system of claim 13, further comprising logic configured to
2 dynamically receive information about unavailable hardware functionality and
3 replacement instructions that are configured to replace original program instructions
4 that require the unavailable hardware functionality.

1 17. A method for dynamically patching code, comprising the steps of:
2 gaining control over the execution of a program;
3 intercepting program instructions;
4 determining whether the program instructions have been cached and, if so,
5 executing the cached instructions;
6 if the program instructions have not been cached, determining if the program
7 instructions require unavailable hardware functionality; and
8 dynamically replacing the program instructions with replacement instructions
9 that do not require unavailable hardware functionality if it is determined that the
10 program instructions require unavailable hardware functionality.

1 18. The method of claim 17, wherein the step of dynamically replacing the
2 program instructions comprises fetching replacement instructions and storing them in
3 a code cache.

1 19. The method of claim 18, wherein the step of dynamically replacing the
2 program instructions further comprises executing the replacement instructions in lieu
3 of the program instructions each time a functionality associated with the program
4 instructions is required.

1 20. The method of claim 19, wherein the replacement instructions
2 comprise part of a patch that is made available via an application programming
3 interface.

21. A dynamic execution layer interface (DELI) residing between an application and computing system hardware, comprising:

3 a transparent mode layer that is configured to gain control over the operation
4 of the application and to fetch replacement instructions that are to replace existing
5 application instructions;

6 a system control and configuration layer configured to provide policies for the
7 replacement of existing application instructions with the replacement instructions;

8 a core configured to dynamically cache and execute the replacement
9 instructions; and

10 a code cache in which the replacement instructions are cached.

1 22. The DELI of claim 21, wherein the transparent mode layer is further
2 configured to fetch application instructions from the application and wherein the core
3 is further configured to cache fetched application instructions in the code cache.